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# HEALTH RISKS
# THE PERCEPTION OF REALITY AND
# THE REALITY OF PERCEPTION

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## INTRODUCTION

Life is a risky process. It ends with one of the risks evolving into a death-dealing hazard from which there is no escape. Some risks are voluntary, such as riding in an automobile, flying in an airplane or smoking a cigarette. Other risks are essentially involuntary, such as the risk of lung cancer from air pollution, breast cancer as a result of our genetic heritage, or the chance that we may be struck by a meteorite. Most risks have a probability much less than unity of materializing into an adverse health effect. One exception is the risk of death; only the cause and the time of death is uncertain. There is absolutely no uncertainty of whether the event eventually will occur.

Studies of the probability of disability and death from each of the many risks we are exposed to daily have matured collectively into the scientific discipline of Risk Analysis. One might assume that such information would influence our lifestyles. Persons using tobacco would quit, because the risk of lung cancer from this noxious weed is well understood both qualitatively and quantitatively. We all would be careful about driving and working around the house, because the two most likely places of serious accidents are streets and the home. We would eat thoughtfully and exercise regularly, and we would choose our occupation and recreation with safety in mind. One might assume that these decisions, and others like them, would be integrated into selections of options for healthy lifestyles. One might make that assumption--but for most persons, the assumption would simply be incorrect.

We often assume that providing information about health risks will cause people to change their behavior so that their risks are reduced. This assumption is fundamentally flawed. The flaw is that the relationships are very tenuous between information and education, education and behavior change, and behavior change and risk reduction. The "Health Education Paradigm" that proposes that information leads to risk reduction is suspect at best. At its

worst, it can pre-empt other, more successful approaches to helping people reduce risks. The real challenge of risk analysis and communication is to recognize that the processes of risk perception and reduction are far more complex than simply assimilating health risk data and making appropriate behavior changes as a direct consequence.

The complexity of risk perception often is underestimated by persons who try to convey information about health risks. Often these persons assume that simply providing "the facts" will lead to more intelligent decisions about health risks and their reduction. The success of these efforts usually is frustratingly disappointing. To influence decisions about health risks, one must deal with the perception, as well as the reality, of risks. To most of us, in fact, the perception of risks is more "real" than the reality of risks--often in spite of direct evidence to the contrary. The adage "People's perceptions of risks are often inaccurate" is a reductio ad absurdium. People's perceptions may be out of touch with reality as interpreted by others. But perceptions are a direct reflection of the way people think about health risks. These perceptions must be accepted as real and addressed as significant if attitudes and behaviors are to be changed and health risks reduced.

## THE CHARACTER OF HEALTH RISKS

Individuals change and grow by taking risks. The same is true of societies. Neither individuals nor societies can thrive without taking risks. Risk aversion limits the potential of individuals and societies for growth and creativity. The issue is not how to avoid risks. It is instead how to choose among risks so that foolish ones are avoided and those that yield benefits worth seeking are selected consciously and intelligently. Occasionally risks can be reduced or eliminated through knowledge and appropriate action. Examples include control of infectious diseases through improved sanitation, reduced occupational hazards by design of safer work environments, improved vehicular safety by use of passenger restraints and decreased use of tobacco in many developed countries. However, no activity is completely free of risks. Even inactivity has risks, as evidenced by the emphasis on exercise as a preventive health measure.

## THE PERCEPTION OF RISKS

The perception of risk is usually a rather irrational process. The presentation of purely objective information (ie, "the facts") is usually not an effective deterrent to irrational thinking or behavior. An approach from the premise that "If you only understood the facts, you would think like I do" is almost sure to fail. It is, in fact, usually viewed as arrogant and elitist. A more effective approach is to start from the way risks are perceived, and to work gently toward a more objective appraisal of reality, dealing with the perception of risks at each step.[1-4] There is no such

thing as "a misperception of risks". There is only the perception. The trick is to bring the perception into accord with the facts.

In addressing the perception of risks, one should recognize that often the actual risks are not even the issue. Frequently the issue is the freedom of deciding for oneself whether or not to accept the risk. The individual's right to decide, rather than the risk itself, is often the bigger issue. For example, most persons accept the not inconsiderable risks of riding in automobiles because their use is considered voluntary, and because they believe that they have some influence on the magnitude of risk, at least if they are driving. These same persons may actively oppose a hazardous waste disposal site or nuclear power reactor because they resent the involuntary imposition of risk, no matter how slight the actual risk may be. When risks are imposed in an involuntary manner, they often are interpreted as a moral and ethical dilemma, rather than a scientific issue. In such circumstances, risks cannot be addressed effectively by a simple presentation of data. Any effort to dismiss the perceptions and confine the discussion to facts makes the effort, and the presenter, irrelevant to the concerns of the audience. It also polarizes the issue and, not infrequently, the audience, into irreconcilable factions.

## RISKS AND INDIVIDUALS

Most persons are reluctant to think objectively about health risks. Assuming total responsibility for decisions about health risks leads to an obligation to live with the consequences of those decisions. When people have all the available facts and are totally free to make decisions about risks, they cannot direct the blame for adverse consequences elsewhere. Most persons prefer that others (eg, governmental agencies or responsible individuals) establish rules and standards about health risks. In the absence of official rule-making bodies, community consensus and peer opinion often is looked to for guidance in decision-making. Then if adverse consequences occur, they can be attributed to inadequacy of the standards, lack of diligence in enforcing the rules, or the stupidity of friends and community leaders. That is, someone else is at fault and can be blamed for the consequences. Laying the blame at someone else's feet is particularly likely if the responsible entity is suspected of vested interests, bureaucratic bungling or inattention to detail. Being able to blame someone else if adverse effects occur greatly enhances the acceptability of risks.

Health risks are more acceptable if they are described in terms of "statistical" rather than identifiable victims.[5-7] For example, descriptions of injuries in an industrial or construction accident are more impressive than are statistics of the carnage on highways. The fascination of onlookers viewing a serious automobile crash is a manifestation of the sudden and shocking realization of the human tragedies hidden away in statistics about highway accidents.

Risks and benefits are almost always interpreted personally. Involuntary risks, no matter how small, must be accompanied by personal benefits if people are to accept them. Frequently, the decision to accept a risk reflects an asynchrony of risk and benefit. Activities where the benefits accrue quickly and the risks are deferred until later are usually more acceptable than those whose benefits and risks occur simultaneously. If the risks are immediate and the benefits delayed, then the activities may be rejected no matter how much the benefits may outweigh the risks.

Risks to children and to immediate future generations raise considerable alarm.[8-9] When one's family is involved, even deferred risks may be an unacceptable price for immediate benefits. However, if the risks are deferred to a remote future generation, most people feel little concern.

Often the benefits of an activity are shared among many individuals while the risks are assumed by only a few. This process is deemed acceptable only if the risks to the few are not inordinately high, irrespective of the collective benefit. Of course, those persons exposed to the risks must share in the benefits, or even receive some additional benefits such as salary bonuses (referred to as "hazard pay") or additional community resources (eg, water recreational activities provided by a dam for hydroelectric power).

## RISKS AND SOCIETY

When life is comfortable, risks are less tolerable. Comfort implies the presence of a certain measure of benefits, and additional benefits may not justify extra risks. People living comfortable lives tend to be risk-averse and satisfied with present conditions. They tend to avoid risks even though the risks may stimulate growth and creativity. Risk aversity is apparent today in many developed societies, especially western Europe and the United States. Older people tend to be more wary of risks, perhaps because they are more experienced than younger persons and more conscious of their own mortality and vulnerability to disability. They may also be less ambitious in seeking benefits, because they have fewer people to share them with and less time to enjoy them. A society with a substantial elderly population tends to be less risk-taking than one dominated by young people. This trend is increasingly apparent in the United States, and presents a serious challenge to civic leaders faced with difficult issues that can be addressed effectively only through a fair degree of societal risk-taking in the near future. An economy based on services rather than industry tends to be less adventuresome and more cautious about risks. The economy of the United States is moving rapidly in this direction.

In a technologically complex society, many of the health risks are imposed involuntarily as a trade-off of risks and benefits. These risks are generally less acceptable than those which offer freedom of choice. The adverse consequences of involuntary health

risks, including the personal and public anxiety and societal unrest that they create, inculcate a desire for some type of compensation. The increasingly litigious culture of the United States is a direct reflection of this attitude.

## THE RESPONSE TO RISKS

Risk implies a possible adverse consequence that may or may not materialize as an effect on health and wellbeing. Risk creates an aura of uncertainty, and people are discomforted by uncertain consequences and a fear of the unknown. As the uncertainty increases, the tolerance for risks decreases. As a consequence, health risk information is almost always interpreted emotionally rather than objectively.

Most persons, including representatives of the public media, have little understanding of probability, and tend to think in causal rather than probabilistic terms. To these persons, anecdotes and personal experiences are far more meaningful than statistics and epidemiology. Presenting health risk information in terms of quantitative probabilities of adverse consequences leads to confusion of the audience and frustration of the presenter.[10-11] Most persons simply do not (and refuse to) comprehend a statement such as "an increase of 1/100,000 in the probability of future cancer per millisievert of whole body dose equivalent from ionizing radiation." They tend instead to think causally, using only the information they can intelligibly extract from such a statement. In this example, the tendency is to focus on the terms cancer and ionizing radiation and to conclude that exposure to radiation leads directly to cancer. And most persons have an anecdote or personal reminiscence that confirms this causal relationship. The perception may be irrational, but it is real and should not be discredited. Any attempt to discuss the health risks of radiation exposure should start from the perception and work towards a more rational understanding of the health risks of exposure to radiation.

The reality and the perception of health risks are often far apart. Communication that has the best chance of succeeding starts with the perception and works towards the facts. Any effort to discredit the perception as irrational and ignorant is interpreted as arrogant and unresponsive to the concerns of the audience. Persons trying to address health risks may prefer to deal in facts rather than ad hominens; to do so exclusively, however, only diminishes the effectiveness of the presentation and discredits the presenter.

## THE ACCEPTANCE OF HEALTH RISKS

The likelihood of adverse consequences is important to persons exposed to health risks. Many other factors are also important. For example, the severity of outcomes and their proximity to exposure to risks influence the acceptability of risks. Death and major disability are more undesirable outcomes than are minor

inconveniences occurring as a consequence of health risks.[12-13] Pain and suffering caused by adverse consequences also influence the perception of risks and their acceptability. Risks that result in familiar events (eg, automobile crashes) may be more acceptable than those that produce uncommon consequences (eg, industrial disasters), even though the uncommon character of some events implies substantially lower risks. Greater attention and dismay is paid to events where multiple deaths and injuries occur, especially when they seem to be random occurrences (eg, airline crashes) or involve substances (eg, radiation and noxious wastes) that evoke a sense of fear and dread. Public attention is especially riveted on technologies such as nuclear power with a history of incidents attributable to human error. But without human intervention, some complex emerging technologies such as genetic engineering and robotically-controlled mass transit systems may ultimately be interpreted as too risky for societal development.

Risks are more acceptable if the degree of exposure to them can be controlled, if some possibility exists to reverse adverse consequences in the future, or if they produce consequences that are temporary rather than permanent. Peer pressure is often very influential in determining whether risks are accepted or rejected. This pressure is especially important for adolescents and young adults, but almost everyone is influenced to some degree by the opinions and attitudes of peers about health risks and their acceptability.

## COMMUNICATING RISK INFORMATION

Communicators of information about health risks often adopt the wrong approach,[14-15] as exemplified by health risk messages that usually stress risks rather than benefits, and emphasize possible adverse effects rather than safety and the likelihood of no effects. For example, the air pollution index is quoted rather than the level of air quality; toxic wastes are mentioned rather than the byproducts of industrial developments; levels of discharge of noxious substances are described rather than their degree of containment; and the possibility of a nuclear emergency is focused upon rather than the safety record of the industry. Emphasizing the public's "need to know" certain information also misses the mark; the public has a "right to know" information relevant to its decisions about health and health risks.

People are influenced by the degree of media attention given to various risks and their adverse consequences. They also are affected by how recently media coverage was focused on them. Often the media has been accused of irresponsible presentation of information about health risks. Persons concerned about objective presentation of risks often implore the media to educate the public realistically about risks, rather than simply to report accidents and disasters in a manner that stimulates the public's prurient interests. Spokespersons of the media respond by disclaiming any obligation to educate; in their view, the responsibility of the

media is solely to convey information, not education, within the context of selling subscriptions and recruiting viewers. They recognize that safety and the avoidance of hazards and disasters are not news; neither are intelligent decisions and responsible behaviors. The media is a convenient target for blame by those frustrated with the difficulties of conveying health risk information and the disappointments of being unable to elicit rational attitudes and behaviors in response. This blame is misplaced, because it misinterprets the role of the media in our society, at least as it is understood by those responsible for it.

## THE MEDIUM OF HEALTH RISK INFORMATION

In earlier times in our society, we assumed, somewhat naively, that industry would address any health risks associated with its activities. We also assumed that government agencies would ensure that this obligation was satisfied. In the more iconoclastic culture of the United States today, industry is viewed, somewhat cynically, as willing to cut corners at the expense of safety, and not infrequently government agencies are considered too bureaucratic and bungling to protect the public health and the welfare of individuals. Today activist groups of concerned citizens, and the threats of legal action, have largely supplanted trust in industry and reliance on government as deterrents to health risks. This distrust of industry and loss of confidence in government is undermining the nation's ability to move into new horizons coincident with a progressive economy, and is changing the orientation of society from a posture of stimulating new ventures to one of deterring them.

Today the credibility of health risk information depends as much on who presents the information as on what is presented.[16-17] Purveyors of such information need impeccable credentials, a reasonable level of knowledge, and no interest in the outcome other than the welfare of the community and the health and safety of persons in it. Health risk informants should be residents of the affected community so that their health, and that of their families, are influenced like that of everyone else in the community.

Persons knowledgable about health and the risks to it at both the personal and public levels are among the best candidates for these responsibilities. Educational, science and health leaders in the community are foremost among these resources. Physicians and scientists have an opportunity, and perhaps even an obligation, to become more involved as community resources in personal and public education programs about health risks. It is principally through their efforts that attitudes will be changed and behaviors altered so that more intelligent decisions will ultimately be made about health risks and their reduction.

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